

## PT AEI PREFERRED ALTERNATIVE PROJECT ON “X” FIELD IN NEAR EXPIRATION OF PSC INDONESIA CONTRACT PERIOD REFERRING TO INVESTMENT ANALYSIS

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### OPENING PARAGRAPH

PT AEI (Andalan Energy Indonesia) as oil company have been working under PSC Indonesia and reaching near contract expiration in 2021. To meet obligation as Contractor to deliver agreed oil production, PT AEI shall find a “way” to maintain or to reduce declining oil production rate by adding oil reserves but still generating profit to the company. Near expiration of contract, corporate economic hurdle requirement, and need for oil production obligation are main issues to be resolved in current PT AEI business condition. One of alternative which likely suits to PT AEI situation is a project to convert idle injector well to become oil producer well on “X” field. Comprehensive investment analysis should be developed to prove that the project sufficiently profitable comparing to other competing projects. DCF and key economic indicators (NPV, IRR, PBP, DPI, and VC) are utilized to analyse project economic. Cross function decision makers are involved in approval process for the project to be proceeded or not. It consists of Asset team management, Drilling and Completion team management, and Facility team management. Extended decision makers may be added as required.

### COMPANY BACKGROUND

PT AEI is subsidiary of Andalan Energy Corporation (AEC) based in San Ramon, California, United States of America. The AEC started in 1879 at California, USA as oil company to find oil source, to drill a well as oil conduit, to produce, and to sell them. It continued to grow as International Oil Company (IOC) with expanding scope of operations, i.e. upstream (explore, produce, and transport crude oil and gas), downstream (refine, market, and distribute transportation fuels and lubricants; produce and sell petrochemicals and additives), and apply any technologies that create values for every operations’ aspects on the company. AEC have been expanding their business to more than 20 countries around the globe, including Indonesia.

In Indonesia, under company name of PT AEI, the company started to operate in 1924, to do geological expedition to Sumatra. It started drilling campaign in 1941 and found giant field called “X”. The steam flood technology was then introduced at X field and became of the world’s largest enhanced-recovery steam flood project. In 1944, PT AEI discovered another giant field called “Y” which became largest oil field ever discovered in Southeast Asia.

PT AEI hold concession under PSC term in island of Sumatra, which will expire in 2021. In 2017, PT AEI production was reaching net daily production of averaged 122,000 barrels crude oil and 21 million cubic feet natural gas. X field is the largest producing field in PT AEI concession with net daily production averaged of 54,000 barrels crude oil in 2017. Oil produced from every well in the fields will be pumped via production pipeline to gathering station for separation process between oil, gas, and water. Water will be utilized back to fields either for steam flood injection purpose, water injection, and operation needs. Gas is used for fuel on steam flood generator, to be sold, or flared for disposal. Oil as main target is transported via production pipeline to gathering station at port to sell to market.

### SPECIFIC AREA OF INTEREST

Wells capital projects related in PT AEI during production stage is developed and executed mainly by Asset team, Drilling & Completion (D&C) team, and Facility team. Asset team is a main customer who own the project and the budget. They will provide project objective, subsurface information, and expectation that shall be agreed and delivered by D&C and Facility team. D&C team is accountable for downhole related activities such as well design, well execution, and well service related. While Facility team is responsible for surface related activities such as road and location preparation and well facility installation. Other supporting teams is likely required depending on project needs, i.e. business planning, finance, land, and public affair. Well capital project could be drilling new well or workover existing well. Both are relatively requiring high capital even though drilling new well is likely higher.

Key uncertainties will drive magnitude of cost that shall be analysed in capital budgeting. Under PSC Indonesia term, project cash flow shall be thoroughly calculated as it will impact to project economic. In addition, Discounted Cash Flow model is used to generate project profitability indicator.

## SPECIFIC PROBLEM

INJC project is workover existing well capital project type. The project has their own complexity for execution with additional situation that PSC contract in near expiration. Economic analysis is required to compare with drill new well capital project type which deliver equivalent oil reserve. Other factors may be considered to develop comprehensive analysis and to provide detailed conclusion and recommendation for decision maker. Based on detailed analysis on risks and uncertainties analysis in INJC project, following factors are determined to be the most impacted to project viability and shall be further analysed:

- Economic factor: oil price uncertainty, time to expiration when project is delayed.
- Subsurface factor: oil and water production forecast, oil reserves forecast.
- Operations factor: well complexity which lead to higher expenditure and project delay.

Production forecast is utilising company proprietary forecast tool which developed based on surrounding offset wells production performance. Capital budgeting is utilising company SME (Subject Matter Expert) recommendation which based on historical projects cost under company. Oil price forecast is using data from reputable forecaster. Cash flow calculation is based on PSC Indonesia term and condition. Valuation method for investment is using DCF model. Common key economic indicators are utilised to analyse project economic. Simulation on several scenarios and simple decision tree is needed to comprehend recommendation for decision makers.

## ALTERNATIVES

INJC project budgeting analysis considers two main things, CAPEX (Capital Expenditure) and OPEX (Operating Expenditure). CAPEX is needed to fund “new” asset while OPEX is needed to fund operations after asset puts on service.

CAPEX for converting 10 wells are used for Well Program (spent by D&C team) and Surface Facility Program (spent by facility team). Based on analysis, likely case for CAPEX is:

- Intangible= US\$ 2.186 million
- Tangible= US\$ 1.757 million
- Total= US\$ 3.943 million

OPEX is calculated using determined “Lifting Cost” given US\$ 0.7 per barrel of produced fluids (oil and water) from well puts on service until contract expired. Based on calculation, likely case or P50 case is at US\$ 1.437 million. Cash flow calculation is using term in PSC Indonesia term between GOI and PT AEI with input parameters suggested by PT AEI subject matter expert refer to POO (Probability of Occurrence) methodology. Output POO is Expected Value (EV) that come from percentage combination of Low, Likely, and High case. Low, Likely, and High case is developed based on various assessments of uncertainties and complexity on the project. Table 1 shows the methodology.

Table 1 POO Methodology of INJC Project for Cash Flow Data Input

Input Data	Probability of Occurrence (POO)			Expected Value (EV)
	Low	Likely	High	
CAPEX Estimation	0.3	0.4	0.3	0.3 Low + 0.4 Likely + 0.3 High
Production Data Forecast	0.25	0.5	0.25	0.25 Low + 0.5 Likely + 0.25 High
Oil Price Forecast	0.3	0.4	0.3	0.3 Low + 0.4 Likely + 0.3 High

As a result, total amount of net cash flow for INJC project is expected around US\$ 1.22 million with US\$ 1 million unrecovered cost from tangible portion due to depreciation term. Discounted Cash Flow (DCF) method is used to understand profitability of INJC project investment. It will reflect to key indicator economic as a result, sourcing from DCF method calculation. Table 2 shows the result with discounted factor (WACC) 8.37%.

Table 2 INJC Project Key Indicator Economic

Key Economic Indicator	INJC Project
Investment	US\$ 3.920MM
NPV	US\$ 0.898MM
IRR	44%
PBP	18.74 months
DPI	1.23
VC	US\$ 0.133MM

Similar investment analysis is performed to compare INJC project to other similar projects which deliver equivalent oil reserve. Table 3 shows the comparison result.

Table 3 Economic Key Indicator Comparison among INJC Project vs. Competing Projects

Economic	INJC	Drill A	Drill BC	Drill ABC
Investment	US\$ 3.9MM	US\$ 14.4MM	US\$ 17.8MM	US\$ 15.5MM
NPV	US\$ 0.9MM	-US\$ 1.0MM	-US\$ 0.6MM	US\$ 1.1MM
IRR	44%	-3%	4%	20%
PBP	6.78 months	6.61 months	6.54 months	6.86 months
DPI	1.23	0.93	0.97	1.07
VC	US\$ 0.133MM	-US\$ 3.8MM	-US\$ 4.0MM	-US\$ 1.9MM

Note:

- Drill A is drilling 19 new wells targeting A sand formation.
- Drill BC is drilling 23 new wells targeting B and C sand formation.
- Drill ABC is drilling 17 new wells targeting A, B, and C sand formation.

Using simple D-tree analysis, among competing projects, Drill ABC is the best option, however when competing with INJC Project, INJC Project has better economic key indicators.

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